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# SCIENCE NEWS-LETTER

*The Weekly Summary of Current Science*

A SCIENCE SERVICE PUBLICATION

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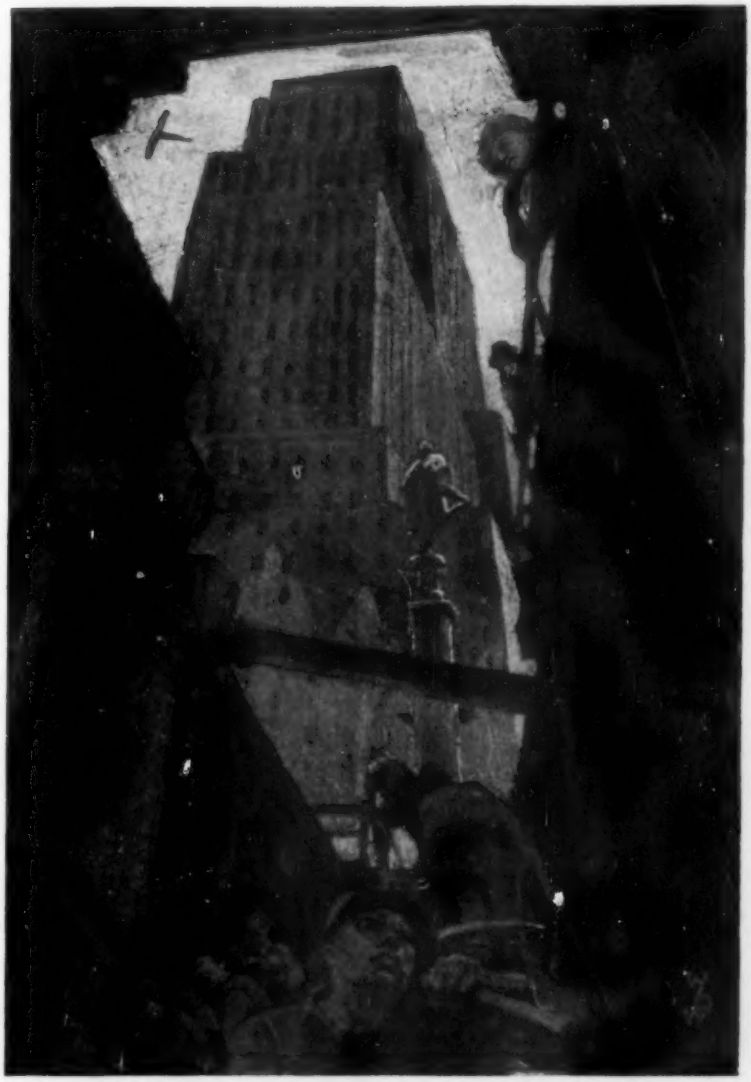

## SUBWAY AND SKYSCRAPER

(See page 306)

Vol. XIII No. 371

# Lost City of Olynthos Uncovered

*Archæology*

Excavations at the newly found Greek city of Olynthos have begun to reveal the splendor and the dramatic downfall of this long buried and long lost metropolis near Mt. Olympus.

Dr. David M. Robinson, professor of archæology at the Johns Hopkins University, who identified the ruin as the once famous Olynthos, has set 150 refugees of the Near East at work digging at the important site.

In a letter from Dr. Robinson, just received by Dr. Hugh Young, of the Johns Hopkins Medical School, he reports that he has already excavated a great fortress with high walls and towers. This fortress protected the city when it was beseiged in the days of shifting alliances and frequent warfare between Greek cities. When Olynthos fell before the relentless attack of Philip of Macedon, in 348 B. C., the houses were razed, art treasures demolished, and most of the people of all ages and ranks were sold into slavery at public auction.

"We have found the walls and houses within which the Olynthians were often shut up in time of siege," Dr. Robinson writes. "Every house has a wine jar or two, often fallen upside down, showing how suddenly the city was destroyed and abandoned.

"In one house, which may be a rich Olynthian's suburban villa, we have found several rooms paved with Greek mosaics. We have unearthed two house altars, the sink for washing dishes, the dining room table, many coins and broken vases, and three or four beautiful sculptured antefixes, the stones for ornamenting the edges of the roof. These have sculptured winged griffins in the excellent Greek style of art.

"Demosthenes, in one oration, tells how the ancient Olynthians grew rich and how they improved their houses and displayed an unusual magnificence. In other words, I think we have found the aristocratic suburb of ancient Olynthos on a separate hill from the main city or metropolis."

Ancient Olynthos must have been much larger than any one has supposed, with at least 65,000 people, Dr. Robinson believes. In its day it was the most important metropolis of Macedonia, but in modern times its very location has been a mystery until Dr. Robinson's discovery.

*Science News-Letter, May 19, 1928*

## Subway and Skyscraper

*Engineering*

"Both know the same pains of birth . . . skyscraper and subway. The same shattering of rock initiated their existence. The scene might well be in the Colorado San Juan . . . a prospect gash with startling Lizard Head raising its peak to sunlight . . . not Columbus Circle, New York, with gleaming building towering above subway workers."

So says *The Explosives Engineer* of the painting which forms the cover of THE SCIENCE NEWS-LETTER this week. The painting, one of a series made for *The Explosives Engineer*, by W. D. White, presents a scene that is within a few feet of a thoroughfare through which tens of thousands pass daily, yet one which only the subway workers see.

But in the mind of the artist this contrast of rough timbers temporarily supporting a street in order that men might travel faster under it, and the completed bulk of a great building, has a significance that matter-of-fact mortals would miss. Here, on canvas, however, he has recorded it.

*Science News-Letter, May 19, 1928*

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A zoological garden along the Riviera is entertaining 60 orang-utans that are en route from Sumatra to various animal collections.

## *In This Issue—*

TNT as a builder, p. 306—*Olynthos*, p. 306—*Asphalt paper* and garden sass, p. 307—Mound-builder *housekeeping*, p. 309—Captive lightning, p. 309—*Isostasy*, p. 310—Quartz for *radiocinema*, p. 311—Chemical with aliases, p. 311—Edison, *medalist*, p. 311—Retouching *movies*, p. 311—Nothing but *wiggles*, p. 313—Making people over, p. 313—Digging up the *Bible*, p. 313—Seeing *cells*, p. 315—Golf-course *palaeoanthropology*, p. 317—Warlike *hens*, p. 317—*Calvert* colors, p. 317 New pneumonia serum, p. 317—Medical *papyrus* Englished, p. 317—*In Memoriam Homari*, p. 318.

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All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

# Magic Carpet of Paper for Gardens

*Agronomy*

By Frank Thone

Spring is here. The March winds have cleared off the last of the snowbanks, and for weeks the early bird has been making life miserable—and brief—for the early worm. The smell of fresh-turned earth is in the air, as the farmer soberly follows his plow around the field, and the suburban city man, with the call of his grandfather Adam strong upon him, spades away industriously in his back yard. Not even the sight of fat, writhing angleworms, which in his boyhood would have turned him from his gardening to the even more primitive nature-occupation of fishing, now affects him. He leaves them to the robins. He is going to have a *garden!*

But weeks hence, as the weather warms up, his ardor will cool. Then will he feel the curse of Adam: thorns and thistles will his garden bring forth to him, and every time it rains the soil must be pulverized again lest it cake brick-hard and evaporate out all the precious moisture. Verily, only in the sweat of his face will he eat bread—or lettuce, or radishes, or beans, or beets, or kohl-rabi, or any other kind of garden sass. There is joy in spading the good brown earth, but nothing but lumbago and grief in pulling weeds or wielding the dusty hoe. The farmer and truck-raiser, who have to depend on their labor for their living, perspire away philosophically, but the suburbanite, who began his gardening more or less for pleasure and is too proud to quit even after it has ceased to be fun, sighs and wishes that Ancestor Adam might have found some way of sneaking back into that delectable garden where there weren't any weeds and the vegetables grew themselves without needing to be hoed.

The Garden of Eden will never be refound or regained, but the curse of Adam can at least be mitigated. Gardening will always be labor, but much of the back-aching, heart-breaking drudgery can be taken out of it. And sometimes the trick is so simple that we stand and gape and wonder why nobody ever thought of it before.

The latest dodge for taking some of the sweat out of gardening is such a trick. And curiously, too, it was first thought of and put to use in the tropics, whereas we are accustomed to think of improvements being devised in the more energetic cooler climates and later on introduced into tropical practice. Still, why shouldn't the tropical planter think of sweat-sparing methods? Where it's 100 degrees in the shade—and very little shade—it's dollars in the pocket if you can save your field hands from the risk of sunstroke.

*Dr. L. H. Flint, of the U. S. Department of Agriculture, who has raised wonder crops of vegetables under the "magic carpet" of asphalted paper*

This tropical trick that has been brought in from the pineapple plantations of Hawaii for the possible benefit of mainland American gardeners has been talked about under the intriguing and romantic name of "the Magic Carpet." In sober actuality it is nothing more romantic than asphalt paper, more or less like the kind used in making roofs or for insulating the walls of frame houses. But magic results sometimes come from very commonplace things, like golden eggs from gray geese.

So it has been in the present instance. Some years ago the pineapple planters of Hawaii learned that they could greatly increase their yield per acre by planting their pineapples through holes in a specially prepared paper laid on the ground. It reversed the usual role of roofing paper; instead of keeping the moisture out it kept it in. In addition, it kept the warmth in the soil, thus providing hothouse conditions for the roots of the pineapples at least, and considerably speeding up their rate of growth.

The trick worked so well that the planters bragged about their "Magic Carpet" in advertisements, and one of these advertisements caught the eye of Dr. L. H. Flint, of the U. S. Department of Agriculture. If these paper carpets bring such golden returns in Hawaii, he asked himself, why shouldn't they be good for garden stuff in general, here at home? And being both by temperament and professional occupation an experimenter, he went forth to try it.

He tried it on a much grander scale than the average backyard gardener would have an opportunity to make similar tests, for he had a portion of the huge Federal testing farms at Arlington at his disposal, and all the rolls of paper he wanted, within reason. So he planted plots of all imaginable kinds of garden truck, carpeting the soil on either side of the rows with the asphalt paper. He also planted similar plots of the same kinds of vegetables in the ordinary way, without the protecting paper carpet. Then as the various crops matured he harvested from both the experimental and the uncarpeted "control" plots at the same time, weighed up what he got, and compared results.

His figures showed that this system of paper mulching works quite as well under the conditions of his experiments in the temperate zone as it does in the tropical Hawaiian climate. Increases in yield ranged from a modest 11 per cent. in green peas and 14 per cent. in lima beans to 267 per cent. in watermelons and 516 per cent. in spinach. Crops were increased between 30 and 80 per cent. in green beans, squashes, cantaloupes, pumpkins, cabbage, carrots, okra and tomatoes. They were doubled or better in cucumbers, lettuce, sweet potatoes, beets, green corn and several other vegetables. Two late plantings of green corn were more than trebled. Treble increases resulted also in a late planting of green beans. Potatoes showed a crop increase of 377 per cent. over the yield from the "uncarpeted" plot. The only failure resulted with peanuts, where only half a crop was har- (*Turn to next page*)

# Magic Carpet for Gardens—*Continued*

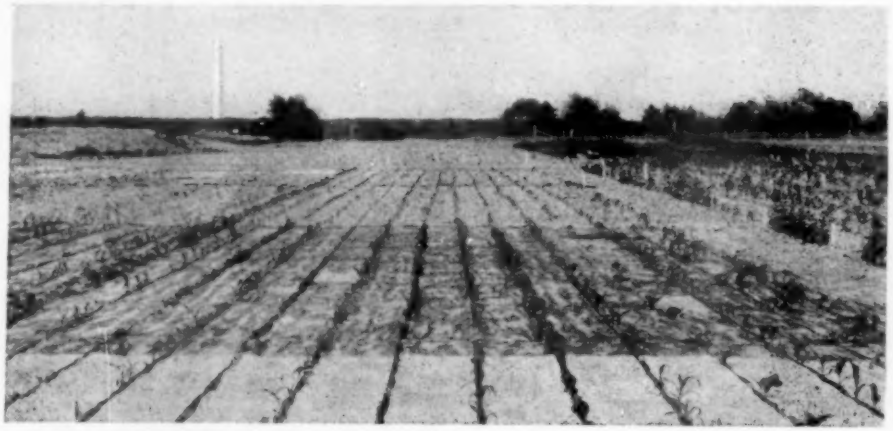
vested, as compared with the control. Further experiments are already under way for this season.

It is as yet too early to prophesy, Dr. Flint states, that all our truck gardeners are going to carpet their ground with paper and thereby double their crops. Economic factors are involved which he has simply disregarded as being not pertinent in these preliminary experiments. Before a gardener can put the paper-carpet system into practice in producing crops for the market, he will have to ask himself whether the cost of the paper and the labor of laying it will be compensated for by the increase in crop and the decrease in the number of hoeings he will need to give it. But it can be tried on a small scale by the home gardener, and at least experimented with by truck raisers of a scientific turn of mind.

The special make of asphalt paper used by the pineapple growers need not be employed in garden-crop experiments in this country. It is rather heavy, being designed to remain on the ground throughout the three or four years' duration of a pineapple planting, and being thus strongly made it is necessarily somewhat expensive. Any of the dark-colored, impervious roofing or building papers to be found on the market will do, so long as they are not impregnated with tar or some other substance harmful to plants. Possibly the heavier, more expensive papers will serve for more than one season. All that is part of the economics of the problem, and will have to be worked out over a period of several years before a definite, positive answer can be given.

The effects of this paper carpeting are three-fold: it attracts and retains warmth in the soil; it prevents evaporation of soil moisture; it effectively keeps down weeds. Each of these effects brings several advantages to the growing crop.

Plants need to have warmth captured and held by the soil for two main reasons. First, their roots grow better and take up water and mineral nutrients more readily in warm than in chilly soil. Second there must also be warmth for the vast, unseen, highly complicated germ life in the soil. that reduces humus and captures nitrogen and performs a dozen other services for the higher plants that are our crops. Each kind of crop plant, and each kind of bacterium and mold and protozoon and



*A field at the Government farm at Arlington, Va., laid out in white paper, black paper, and no paper, for comparison. White was not as effective as black, but was better than none*

worm that is a part of the germ complex, has its own pet temperature—a degree of warmth at which it "feels best" and can do its work to fullest advantage. But roughly speaking, for most of them this favorite or optimum temperature lies around that of the normal human being. From that up and down about five degrees, though they can still exist and carry on, though to less effect, at what would be far below a deadly chill or above a fatal fever in us. Springtime soil temperatures are below this optimum for crops and their germ friends, and the dark-colored asphalt paper, absorbing the heat of the sun and then holding it down in the soil like a blanket on a bed, raises the soil temperature more quickly and thereby speeds up the growing processes and the work of absorption by the roots.

One important effect which may result from the employment of this method of capturing solar heat and in effect producing hot-house conditions in field soils is the shoving northward of various crop areas now confined to the south by the shortness of the frost-free season north of Dixie. Sugar-cane, for which an immense new market has been opened up by the use of its fiber in building-board, may have its cultivation-area in the United States vastly increased by the use of the "magic carpet," and a whole tier of states may possibly be added to the old traditional cotton belt. Similarly, vegetable growing may be carried farther up the mountain meadows and plateaus of the Rocky Mountain region, where fertile soil and plenty of daylight warmth are at present defeated by the rapidity with which the soil radiates away at night what it gains by day.

The second advantage of the paper mulch system is its preservation of soil moisture. Ordinarily the crevices between soil particles act like a lamp-wick, raising the soil water to the surface, where it evaporates into the air. Thus the soil becomes dry down to the lower root levels, and plants begin to suffer and wilt, or else have to spend an enormous amount of their growth-energy making deeper burrowing roots. In our Southwest the roots of such plants as alfalfa frequently go down as much as ten or twelve feet in their frantic search for water which the dried-out upper soil levels cannot supply.

To break up this wick-like capillary action of the soil, we have to hoe our gardens after every rain. This pulverizes the water-conducting crust and leaves instead a blanket or mulch of fine dust through which water travels very slowly. But a dust mulch presents a dilemma of disadvantage. When a light shower falls, it catches the drops but does not let them go on through to the roots below. When it rains harder the dust becomes mud and has to be hoed again as soon as it dries. And whenever we hoe, we cut the upper roots of the plants more or less, and to that extent injure their growth: not to mention the wear and tear on our perspiring frames and our blistered tempers. Wielding a spade in May is fun, but swinging a hoe in July is a torment to the flesh and a vexation of spirit.

The paper carpet solves the soil water problem by maintaining a permanent mulch through which the springtime supply (*Turn to page* 309)

# Earthworks Tell of Early Americans

*Anthropology*

Chapters from the home life of primitive mound-building Indians are being pieced together by George Langford of Joliet, Ill., as a result of excavations in a group of curious ancient pits surrounding two ancient mounds on the Fisher farm near there. Evidence so far unearthed indicates that the Indians who buried their dead in the mounds built their dwellings in this circle of shallow, saucer-like depressions around them. Details of their daily lives can be read from thousands of things taken out of the pits, such as broken bones of the game they ate, weapons and tools of stone, bone, horn and clamshell, fragments of pottery, pendants and other ornaments, and even from the bones of their dead, found buried rather haphazardly all over the place.

The pits themselves were scraped to a depth of three or four feet beneath the original ground level, and the earth thrown out to make a raised rim two feet or more high; their inside diameter ranges 15 to 30 feet. How the Indians roofed them is not known, for no trace of either covering or of supporting central posts has been found. They were warmed by central fires, for the largest deposits of ashes are always found in the middle of the pits.

A note on mound-builder squaw housekeeping is furnished by numerous holes, about arm-length deep, sunk into the ground both within and outside of the pits. These frequently contain quantities of mussel shells or the remains of hoards of corn; they were evidently the Indian equivalents of cupboards or refrigerators. Other holes served as garbage cans.

That these pits were occupied for many generations is evidenced not only by the large quantity of objects of human use that have accumulated in them, but also by the fact that the tools and weapons are not all of the same workmanship. There are two distinct types of stone implements, and two or more varieties of earthenware pots, hinting at the probable displacement of one tribe by another. The human burials are of three types, indicating a succession of at least three peoples. The last tribe to occupy the pits had contact with white men, for some of the burials have glass beads and other objects of European manufacture associated with them. Two arrowheads of iron, a metal unknown to pre-Columbian Indians, have also been found.

All told, 50 pits have been discovered and measured. Thirty-four of them are arranged in a circle around the two principal mounds that existed at this site, as though their purpose was partly defensive. Fourteen others form another group, and a lone pair stands off at a little distance. Much work remains to be done on these pits, though the exploration of their mounds has been completed.

Mr. Langford, whose researches have been formally reported to anthropological societies, is not a professional scientist, but a factory executive. In his excavations of these Indian earthworks, which have for several years been his principal recreation, he has had the volunteer assistance of two of the members of his factory staff, Albert Tennik and Thomas C. Dudley.

*Science News-Letter, May 19, 1928*

## Magic Carpet—*Continued*

of water can not evaporate at all. Beneath it the ground is mellow and moist to the very surface, just as you will find it beneath a chance board you may have left lying on freshly spaded ground that has elsewhere begun to dry out on top. In this mellow top layer the plants can deploy their roots and help themselves to water and mineral salts as fast as they like.

This cutting down of surface evaporation has another advantage. Evaporating water always reduces temperature, as everyone knows who has ever stepped out of a bathtub even on a reasonably warm morning. Water evaporating from the soil reduces the temperature of the soil, which as has already been noted, needs to be boosted rather than lowered in the spring. By preventing its evaporation the paper carpet is acting in still another way to keep the soil warm.

The function of the paper carpet in keeping down weeds is so obvious that it does not need to be discussed in detail. Weeds, of course, spoil the looks of a garden, but, worse than that, they rob the crop of moisture and soil nutrients, and growing over its head they cut (*Turn to next page*)

# Thirty Million Volts From Air

*Physics*

Millions of volts of electricity drawn from the stormy air may soon provide physicists with the power necessary to disintegrate the atom and transmute one chemical element into another, if experiments made by German scientists continue successfully.

Electricity of nearly two million volts, capable of jumping gaps of nearly 15 feet, has been obtained from the air by Drs. A. Brasch, F. Lange and C. Urban, three members of the staff of the Physical Institute of the University of Berlin.

Mount Generoso, in Switzerland, near Lugano, was the scene of these experiments and the scientists are now preparing to return to continue them. This mountain is noted for the frequency of electrical storms upon it, and also it has the advantage of being easily accessible.

It was found impossible to make use of kites for the purpose of collecting the atmospheric electricity, because a wide meshed wire net having an area of several hundred square yards was needed. It was out of the question, they found, to suspend this from kites or balloons, because such means would be particularly undependable during a storm, when the experiments were made.

In order to get the net as far as possible above the earth, they hung it on a cable between two mountain peaks. The span was about 1800 feet, and the height of the net above the ground about 250 feet. At each end were chains of insulators capable of withstanding as much as 3,000,000 volts.

Another problem was to prevent what are called brush discharges, in the conductors which carried the current from the net to the measuring instruments. The intensity of these discharges is less, the greater the radius of curvature of the conductor, so that the discharges would be less from a large hollow cylinder than from a smaller solid wire, with the same amount of metal. As long cylindrical conductors would have been diffiuclt to transport to the mountain, Dr. Brasch and his associates made use of a string of short, round-ended cylinders.

From a lightning proof metal house the observations and measurements were made. (*Turn to next page*)

## Isostasy

*Geology*

To be sung to the tune of "Maryland, My Maryland.

What is it rules the upper crust?
  Isostasy, Isostasy.
What actuates the overthrust?
  Isostasy, Isostasy.
What gives the shore lines wanderlust?
What humbles highlands to the dust?
What makes the strongest stratum bust?
  Isostasy, Isostasy.

That all's in equilibrium,
  So Bowie says, so Bowie says,
Is proven by the pendulum,
  So Bowie says, so Bowie says.
And why the plumb line's never plumb
And why the mountains go and come
Is simple as the rule of thumb,
  So Bowie says, so Bowie says.

Conservatives in vain have cussed
  Isostasy, Isostasy;
The strongest power on earth is just
  Isostasy, Isostasy:
So let us down our deep disgust,
If we'd seem up to date we must
Roll up our eyes and take on trust
  Isostasy, Isostasy.

*Science News-Letter, May 19, 1928*

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**In ages of the past those who sought it—found it**

**But it was often expensive and limited to a few**

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## Thirty Million Volts—*Continued*

The spark gap, under the last of the short cylinders, could be regulated from this post, and, from the length of the gap across which the spark would jump the voltage was determined.

As the chief electrical storms of the neighborhood are in the summer, and as the apparatus was not completed until last August, the best storms had to go unused. One storm occurred after it was completed, and indicated the success of the method. The spark gap could not be made larger than about 15 feet, but the spark easily jumped across it at the rate of about one per second and continued for thirty minutes at a time. Also, it was found with an auxiliary collecting antenna, and with distant storms that affected the main station, that a discharge of once a second was possible at all times.

During the winter months, the experiments were discontinued, but the apparatus was left in place. The scientists are now preparing to return, to take full advantage of the storms this season. With the antenna about three hundred feet above the earth, a height that could easily be obtained, voltages as high as thirty million would result.

Dr. Brasch and his colleagues credit Benjamin Franklin with being the pioneer experimenter in the field in which they are working. One possible use of these huge voltages, they say, is to generate extremely rapid cathode rays, similar to those formed in the tube recently developed by Dr. W. D. Coolidge, of the General Electric Company. These are similar to one of the principal radiations from radium, but with 30 million volts, the artificial rays would travel even faster than those emanating from radium itself.

*Science News-Letter, May 19, 1928*

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Primitive men, it is believed, ate only once a day.

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Grasshoppers are an important item of food in India.

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The price of giraffes has more than doubled since the war.

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The natural gaits of the horse are the walk, canter and trot.

## Magic Carpet—*Continued*

off the all-necessary sunlight. Weeds are the second great compulsion for the hoe; but as we chop them down we face the discomforting reflection that, try as we may to spare the vegetables, we are cutting their roots, too. Even in their death the weeds do us a mischief.

But under the impervious blanket of asphalt paper they never get a chance to be born. Their seeds may germinate, and their feeble infant sprouts crawl about, vainly seeking the sunlight without which they can not live. But, when their initial stock of nourishment has become exhausted, they perish, and the waiting germ life of the soil seizes upon them and returns them to the mold from whence they came, and the roots of our garden vegetables pluck up their substance and turn it into food for our tables.

*Science News-Letter, May 19, 1928*

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Light colored walls make a room look larger than dark walls.

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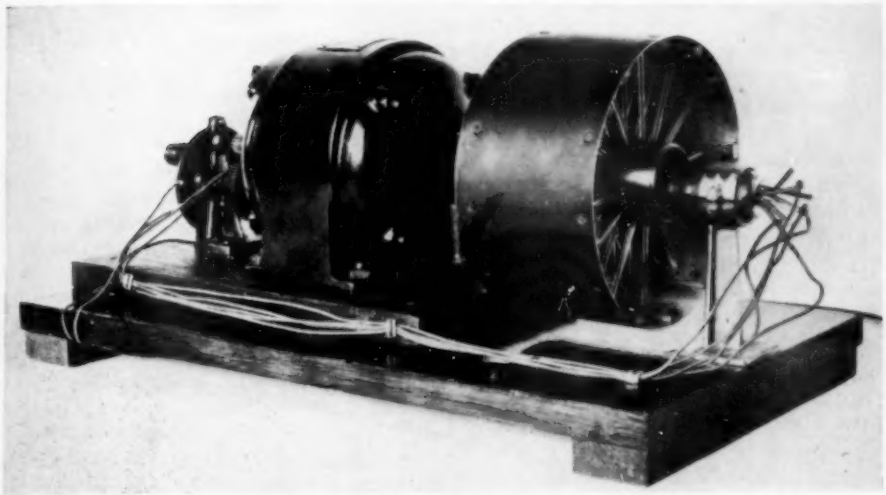
An airplane recently collided with a mountain peak in Europe, killing two fliers.

# Rods of Quartz for Radio Movies

*Radio-Photography*



*JENKINS HOME RADIO MOVIE RECEIVER with the cover removed. The neon tube is in the center of the drum to the right. The rods of quartz carry its light to the top of the drum. On the cover is a mirror to make the image appear vertical, and a lens to magnify it, so that it seems about six inches square*

Rods of quartz, through which light is transmitted like water through a hose, make possible the latest method of television—the radio movies demonstrated by C. Francis Jenkins, Washington inventor. As a result he is able to substitute a seven-inch drum for the two or three foot disc that previous methods of television have employed.

If light is allowed to shine into one end of a rod of fused quartz, it is reflected back and forth as it goes through it. Practically none is lost by leaking out the side, but all emerges through the end.

In the Jenkins home radio movie receiver, which may soon become a common attachment to radio sets, the current from the set, instead of operating the magnets of a loud speaker, causes a glow of a small metal plate sealed in a bulb containing the rare gas neon. Such a neon lamp glows immediately, as soon as the current is turned on, and is extinguished as soon as the current is turned off. The ordinary filament of the incandescent lamp continues to glow for an instant after the current stops, and so cannot respond to the rapid changes required by the television receiver.

In previous methods of seeing by radio, either of movies, or actual objects, the person viewing the received image gazed directly at the surface of a neon lamp. A revolving disc with a spiral row of holes obscured all but the proper spot of the neon glower. These spots of light, seen in rapid succession, were built up into the complete picture seen by the observer, just as the successive pictures of a movie film shown in a theater merge together into a continuous view on the screen.

Mr. Jenkins employs a cylindrical glass tube, in which there is a row of small neon glowers. This is at the center of a revolving drum, seven inches in diameter. Around the surface of the drum is a helical row of small holes. Extending from these holes, inside the drum, to an inner cylinder, almost in contact with the neon lamp, there are a number of the quartz rods, about two inches long, somewhat resembling the wire spokes of a bicycle wheel. (*Turn to next page*)

# Household Chemical Has Aliases

*Chemistry*

Tri-sodium phosphate, one of the most valuable household chemicals ever discovered, apparently has no press agent and so far has escaped the notice of madam housekeeper. If she uses it, at least she does not know it. A survey of the wholesale chemical market, however, shows large quantities of the phosphate going out quietly, soon to emerge under a variety of fancy labels, with various colors and at enhanced prices. Much of this material is adulterated with cheap washing soda.

As a washing powder tri-sodium phosphate has proven to be a remarkable preparation. Its degree of alkalinity is distinctly higher than that of common washing soda, but not high enough to cause damage to dry paint.

The main alkaline strength of the phosphate lies in reserve, due to the unique chemical constitution of the substance. It is the reserve feature which makes it equal in many situations to caustic soda as far as dirt riddance is concerned. For steam-cleaning of automobile chassis; cleansing of greasy hands of mechanics and of furniture subject to much public handling; riddance of scum on lavatories and tubs, and for water-softening the phosphate is proving very effective.

In view of the current American wholesale price of four to six cents per pound (according to location) it is thought that tri-sodium phosphate should find a place on the grocer's shelf under its own name. It is not patented or subject to private control. It is not poisonous or offensive, and requires no chemical skill in handling. There seems to be no good reason why it should appear solely under meaningless trade-marks any more than salt or sugar.

*Science News-Letter, May 19, 1928*

# Edison to Receive Medal

*General Science*

Thomas Edison will receive the gold medal for science of the Society of Arts and Sciences, New York, on May 24, it has been announced. Walter Russel, president of the society, will preside at a banquet at the Hotel Astor, at which the medal will be bestowed, while Dr. Edwin E. Slosson, director of Science Service, will be toastmaster.

*Science News-Letter, May 19, 1928*

# Movies Now Retouched

*Inventions*

Motion picture film can now be retouched, like studio portrait negatives, with the aid of an apparatus just patented in France by L. H. Burel and H. Debain. Instead of looking directly at the negative, as in ordinary retouching, however, the image of the film is projected to a screen, along with the image of the end of the retouching pencil, so that tiny details can be treated.

*Science News-Letter, May 19, 1928*

## Radio Movies—*Continued*

An ordinary electric motor, which is arranged to run in synchronism with the motor at the transmitter, spins the drum around at a speed of 3,600 revolutions a minute. A revolving contact, or commutator, attached to it serves to connect the separate glowers in the neon tube, and so enables the current from the radio receiver to light them at the proper time. The light from the glowing neon tube is carried by the quartz rods out to the round surface of the revolving drum, where the picture is actually seen. Thus a small neon lamp is made to serve the purpose of a much larger one, one as large as the drum itself. The drum turns on a horizontal axis, so a slant mirror, and a large magnifying lens, enables the persons viewing it to see the picture vertically, as on a movie screen.

In his demonstration Mr. Jenkins used a motion picture film as the original object, and this was reproduced both by wire, in another part of his laboratory, and by radio, in his home some miles distant. However, he claims, the apparatus is just as applicable to the broadcasting of views of actual persons or objects. The received picture is a silhouette, and does not show gradations of light and shade. This, he thinks, is not a serious objection, but it is one which he expects to overcome. "At present," he says, "the apparatus is in the 'crystal set' stage." Future developments, he promises, will bring it to the perfection of present day radio or movies.

*Science News-Letter, May 19, 1928*

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# The Cost of Indifference

*Medicine*

WILLIAM GEORGE LEE, in *Childbirth* (University of Chicago Press):

Childbirth, experienced as it is by every inhabitant of the globe, is a phenomenon surely of fundamental and primary importance to mankind, and a consideration of it should have a prominent place in any rational attempt to improve human conditions by education; and yet, because it antedates the development in the individual of all mental processes, it has received surprisingly scant attention. Even those who have had immediate charge of its conduct and care too often belong definitely to that immense group who only passively accept, but never originate or inaugurate change. The paradox is seen, therefore, that the most eventful moments that any of us ever pass through — moments fraught with the most far-reaching consequences—receive only slight notice because it is not realized what a high spiritual and material toll is directly and indirectly paid by the whole public through the disability or death of babies who have already during fetal life imposed many hours of restricted activity or emotional strain upon their parents. Most of us know of particular individuals, either babe or mother, so damaged by the act of birth that they always remain among those seriously handicapped people who constitute a large and permanent burden upon the community. It is not realized surely how much of this damage, which is occurring daily, might be prevented if greater advantage were taken of methods and knowledge already at hand.

*Science News-Letter, May 19, 1928*

## British Radio

*Radio*

ROBERT A. MILLIKAN, in *The Atlantic Monthly:*

In a comfortable English home out in the country in North England a small group is seated, sipping after-dinner coffee, enjoying conversation, and interrupting it now and then to listen to something particularly fine that is coming in over the radio. The technique of the reproduction is superb, but no more so than that with which we are familiar in our American homes, for the whole broadcasting idea, as well as the main part of its technical development, is American in its origins. But the programme that is on the air in England is incomparably superior to anything to be heard here, for the English Government has taken over completely the control of the radio. It collects from each owner of a receiving set twelve shillings a year, and then, with the large funds thus obtained—for there are many radio fans in England as in America—it provides the radio-land public of England with the largest return in education and in entertainment for eight mills a night ever provided, I suspect, anywhere in the history of the world. For it employs only high-class speakers, musicians and entertainers of all sorts, so that the whole British nation is now being given educational advantages of the finest possible sort through the radio, at less than a cent a family a night, collected only from those who wish to take advantage of them.

*Science News-Letter, May 19, 1928*

## Antarctic Climate

*Exploration*

PROFESSOR MECKING in *The Geography of the Polar Regions* (American Geographical Society):

The ban of the ice is hardly broken even in summer. It is noteworthy that the mean temperature of the warmest month is practically always below freezing. Whereas in the Arctic only two small areas, one at the pole and the other in Greenland, are enclosed by the O° C. isotherm of the midsummer month, here the whole great continent is so enclosed and the various sledge journeys to the pole revealed individual temperatures of -50° even at the time of the year when insolation is continuous. Thus a continental climate with cold summers is the most characteristic attribute. There is very little thaw; no flowers blossom in the landscape; there is no sound of rushing torrents; there are no swarms of insects nor of bees and butterflies, as is the case even in northernmost Greenland. Otto Nordenskjöld even found that the snow cover increased in summer. Only where volcanic sand and dust fall on the ice does thawing become of any consequence. The main reason for the cold of the summer is the glacier ice, which down to a depth of one meter proved to be at least 3° colder in summer than a soil layer of the same depth. Solar radiation is, however, intense—so much so that it can burn the skin. "The weather sides of the ponies were quite dry, but their lee sides were frosted with congealed sweat" (Shackleton).

*Science News-Letter, May 19, 1928*

# Solid Matter May be Waves

*Physics*

So-called "solid" matter—the bricks of our homes, the sidewalks we walk on; in fact, even the tissues of our own bodies, may consist ultimately of waves, or vibrations. Such is one of the startling conclusions that might be drawn from experiments at the Bell Telephone Laboratories in New York by Dr. C. J. Davisson, in collaboration with his colleague, Dr. L. H. Germer. An extended account of the researches is given by Dr. Davisson in the *Journal of the Franklin Institute.*

The experiments indicate that electrons—one of the important parts of the atoms of matter—may really be waves, and not the infinitesimally tiny particles that previous scientists have supposed them. What Dr. Davisson and his associate have done is to study the way that a beam of electrons, given off from a glowing electric light filament, is reflected from a crystal of nickel. They found that the electrons were reflected in the same way that light waves would be reflected. That is, if the beam hit the face of the crystal at an angle of 45 degrees, for example, it left at the same angle. As the physicist expresses it, "The angle of reflection is equal to the angle of incidence."

At first glance, says Dr. Davisson, this might not seem inconsistent with the theory that the electrons are actual particles. But the electrons are supposed to be so small that some 25 million million would make a row an inch long. The size of the atoms is about a hundred thousand times as great, for only about 250 million of them are required to fill an inch. Furthermore, the distance between the adjacent atoms, in the nickel crystal, is something like 250,000 times the diameter of an electron.

"The difficulty of picturing the regular reflection of particles as small as electrons from a surface made up of bodies as large as atoms is at once evident," says Dr. Davisson. "If we were to fire a load of birdshot against a pyramid of cannon balls, we should not expect to find a little cloud of shot moving off in the direction of the regular reflection from the face of the pyramid. A surface made up of cannon balls is much too coarse-grained to serve as a regular reflector for particles as small as birdshot.

"The analogy is not such a good one, really, for we do not think of electrons rebounding from the surface of an atom in the way that shot rebound from a cannon ball. We have been accustomed to think of the atom as rather like the solar system—a massive nuclear sun surrounded by planetary electrons moving in closed orbits. On this view the electron which strikes into a metal surface is like a comet plunging into a region rather densely packed with solar systems.

"There is a certain small probability, or at least there might seem to be, that the electron will strike into an atom in or near the surface of the metal, be swung about cometwise, and sent flying out of the metal without loss of energy. The direction taken by such an electron as it leaves the metal should be a matter of private treaty between the electron and the individual atom. One does not see how the neighboring atoms could have any voice in the matter. And yet we find that the high-speed scattered electrons have a preference for moving off in the direction of regular reflection, a direction which is related to the plane of the surface. Three atoms at least are required to fix this plane, so that the direction taken by the electron is deter- (*Turn to next page*)

# New Theory in Sociology

*Sociology*

Sociologists who moralize on poverty, bad housing, and delinquency are not dealing with reality at all, according to Prof. Robert R. Kern, professor of sociology at George Washington, who has concluded that the first step toward solving the problems of the universe is to solve the problems of the individual person.

"Making people over, so that they get rid of foolish fears and other inefficient behavior is a real task for sociologists," he states. "How a human being will behave can be predicted and his behavior can be altered by understanding and applying principles of physiology."

Prof. Kern, in cooperation with his students, has conducted over 1,000 experiments in predicting and reorganizing behavior. The students use themselves as subjects of the experiments and by understanding their own bodily mechanisms they are better equipped to understand why other people and large groups of people act as they do.

Emotions are inefficient as guides in the opinion of this sociologist, who believes that social problems should be attacked from a realistic physiological point of view.

"A man may have developed a dislike for milk because of some highly emotional and disagreeable experience with it," he explains. "Now, milk is wholesome, and if he were to get sick he might be seriously handicapped by his unreasonable aversion for it. Yet, the very sight of it produces a physical disgust that is so real that it must be taken seriously.

"The first problem is to help him trace the mechanism of the neural hook-up that has been established in his body. He sees how the sight of a bottle of milk sets up the same old nervous mechanism, carrying a current over the same nerve route, effecting the same visceral muscles, and producing the sensation of nausea. Then, he tries to direct and re-route the nerve current by substituting for the old emotion an unemotional attitude of thinking how the milk will be good for him." (*Turn to next page*)

# Bible Sites Located

*Archaeology*

No less than 1,312 of the places that made Bible history in ancient Palestine have been accurately located by archaeologists, according to Dr. George S. Duncan, professor of Egyptology and Assyriology at American University in Washington.

Picks and spades wielded by scientists are unearthing so much important evidence about the Bible that it is like a new book, Dr. Duncan pointed out.

"Hebrew architecture was deeply influenced by Egypt," he stated. "Solomon's temple and its utensils were modeled after Egyptian patterns. Temples on the Nile contain altars, tables with bread, and arks with cherubim, all recalling the Bible descriptions.

"Archaeology shows that the first chapters in Genesis are old traditions originating in Babylonia. The Hebrews monotheized them and spiritualized them and made them the vehicles of most important religious truths. It is a great mistake to make the chapters standard for scientific knowledge. The Bible is a religious book, not a scientific treatise."

## Solid Matter May Be Waves—*Continued*

mined, not by one but by three atoms, at least.

"One may say without qualification that in terms of atoms and electrons and their interaction as we have been accustomed to picture them the regular reflection of electrons from a metal surface is quite incomprehensible.

"Of course, if electrons were waves there would be no difficulty. We think we understand the regular reflection of light and of X-rays—and we should understand the reflection of electrons as well if electrons were only waves instead of particles. This observation, though true, does not seem a particularly valuable one. It is rather as if one were to see a rabbit climbing a tree, and were to say: 'Well, that is rather a strange thing for a rabbit to be doing, but, after all, there is really nothing to get excited about. Cats climb trees—so that, if the rabbit were only a cat, we would understand its behavior perfectly.' Of course, the explanation might be that what we took to be a rabbit was not a rabbit at all, but was actually a cat. Is it possible that we are mistaken about electrons? Is it possible that we have been wrong all this time in supposing that they are particles, and that actually they are waves? Well, I do not need to enumerate the many reasons we have for believing—I may say for knowing—that electrons are actually particles."

Another experiment brings out the similarity to X-rays in an even more striking way.

"We direct a stream of electrons against a target of ordinary nickel—a target made up of many small crystals instead of one large one—and we never, under any circumstances, find any indication of regular reflection," he says. "Electrons are not regularly reflected from a target of ordinary polycrystalline nickel.

"It seems curious that electrons should be reflected only from a crystal-face—and then we remember that this is true also of X-rays. X-rays may be regularly reflected from the face of a crystal, but not from a polycrystalline mirror. The difference between light and X-rays in this respect is due, as we know, to a difference in order of wave-lengths. The lengths of light waves are great compared to the distance between atoms in solids, while the X-ray wave-lengths are comparable with these distances."

Since scientists also have good reason for supposing that the electrons are particles, there is a conflict of ideas that he cannot explain. The so-called Schrödinger wave mechanics, based on an idea suggested by a French physicist, L. de Broglie, has suggested that electrons are either made up of, or accompanied by, a system of waves and this, he thinks, may help explain the difficulty.

"Are electrons waves?" he asks. "The easiest way of answering this question is to ask another. Are X-rays waves? If X-rays are waves, then so also are electrons. But we are no longer so certain as we used to be that X-rays are waves. The Compton effect and the photoelectric effect are most simply described by supposing that there is some sense in which X-rays are particles.

"It is all rather paradoxical and confusing. We must believe not only that there is a certain sense in which rabbits are cats, but there is also a certain sense in which cats are rabbits."

*Science News-Letter, May 19, 1928*


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## New Theory in Sociology—*Continued*

Explaining the theory of brain physiology on which his experiments are based Prof. Kern says:

"First there are the conducting neural cells which conduct nerve currents from sense organs and sensory points to the primary, or sensory, brain cells. These primary brain cells are the final points at which human beings may influence sense experiences. Then there are secondary, or interpretative brain cells which are the final points at which we may influence the memory or imaginative experiences. Then there are conducting cells which conduct nerve currents from one group of secondary brain cells to another. And there are also conducting cells which serve to conduct nerve currents to motor cells which in turn forward the current over systems of cells which distribute the current to the muscles.

"There are two types of hook-up between these brain cells. One is an original response, following a prescribed circuit, such as the fear response of a baby at a loud noise.

"The other type of circuit is over built up hook-ups. Our experiments indicate that these hook-ups may be built over the secondary brain cells but never between primary brain cells. By building new hook-ups among the brain cells which function as interpretative cells we can not only modify our experiences but also our conduct. The new paths that are established for the nerve current control the impressions that are permitted to come to the primary brain cells."

Prof. Kern's experiments in a realistic sociology have been conducted over a period of six years, and they indicate that behavior can be modified along predetermined lines, he concludes.

*Science News-Letter, May 19, 1928*

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Consumption of gasoline increased in all but two states last year.

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More than half the narcissus bulbs produced in the United States last year came from Florida.

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Success in raising the bob-white quail in captivity is reported from the Virginia state game farm.

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There are usually two bear cubs to a litter, though occasionally one or three occur.

# CLASSICS OF SCIENCE: Cells in Animal Tissue

*Biology*

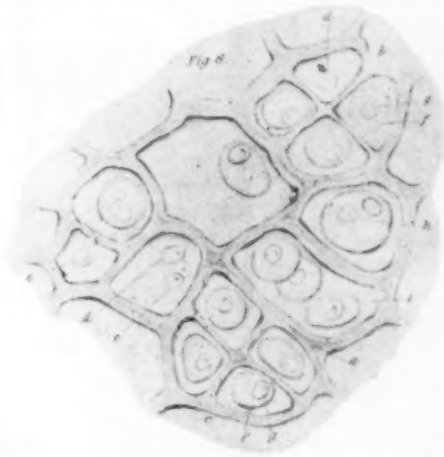
**By following the directions in the first paragraph you can see the same cells that Schwann saw. They started him on a search for cell structure in every kind of animal tissue. You will note in this extract that Schwann actually saw cells in the act of division, but, since he worked entirely with dead matter, he did not realize the significance of his cells with two nuclei. He thought cells form by precipitation, like crystals.**

*MICROSCOPICAL RESEARCHES into the Accordance in the Structure and Growth of Animals and Plants,* (1839). *Translated from the German of Dr. Theodor Schwann by Henry Smith (The Sydenham Society), London,* 1847.

## *Cells in Chorda Dorsalis*

The Chorda Dorsalis in the larvæ of frogs and fishes lies in, or in some instances, under the bodies of the vertebræ, and is continued behind the coccyx, through the whole length of the tail. It is inclosed by a firm sheath, and forms a spindle-like, consistent, gelatiniform, transparent cord, which is thickest at the commencement of the tail, and thence gradually diminishes in each direction, both towards the skull and the point of the tail. It cannot well be separated entire in recently killed animals, but is best obtained from them in the form of delicate transverse sections. If the animal be placed in water for twenty-four hours or longer after death, and the tail then severed from the body at their point of junction, the chorda dorsalis may be entirely pressed out, by gently scraping along its course from the point of the tail, or from the head, towards the wound. As this does not succeed if the animal be allowed to lie out of water for the same period after death, the easier separableness appears to depend upon a penetration of the water between the chorda dorsalis and its sheath; the firmer connexion of it in the fresh condition, however, only upon a more close contact, or wedging in of the chorda dorsalis, and not upon a vascular connection, for I do not suppose that it contains any vessels. Microscopically examined, it exhibits, as J. Müller has discovered in fishes, a cellular structure in its interior, surrounded externally by a proportionately thin cortical substance (rinde), which is beset with scattered granules.

Young cells, which float free, form within the cells of the chorda dorsalis, as in plants. They are, however, in the larvæ of the frog so transparent, that very favorable light



*CELLS IN ANIMAL TISSUE, as drawn by Schwann*

and good instruments are required to see them. The number of cells, also, in which new ones are formed in the larvæ is not great, at least in such as are to be had in the latter part of autumn. In the above mentioned species of Cyprinus, and also in other fishes, they are, however, easy to be seen, and in greater number. Vesicles of very various sizes may be perceived in the cavities of many of these cells, and also in those of the larvæ of the frog, though they are more difficult of observation in the latter; a single one of these vesicles sometimes fills the greater part of the cavity; and occasionally several lie in one cell. They are commonly quite round; but not unfrequently two are in contact, and flattened against each other. That they lie free in the cell follows from the fact that they may be isolated without rupture. If, for instance, a small portion of the chorda dorsalis be torn into minute pieces, and a thin plate of glass with water be placed upon them, by moving this lightly backwards and forwards a few times, some such isolated vesicles may often be brought into the field of vision. They may then be made to roll about, and thus demonstrate their globular form. I have taken great pains to discover a nucleus in their walls, but without success. The young cells of the chorda dorsalis, also, in the larvæ so often mentioned, have often the appearance, so long as they are not isolated, of possessing a nucleus; but one may readily be deceived here, since such a nucleus may belong to a cell lying above or below them. Caution must also be used, not to confound a globular epithelial cell, which may have slipped into the chorda dorsalis in making the transverse section, with the true cells of that structure. I have not as yet been able, with certainty, to observe any nucleus, at least not of the characteristic form, in isolated young cells of the chorda dorsalis. In rare instances, a very small corpuscle lay in the inner surface of the young cell. It must remain a question whether the nucleus is really wanting, or whether it is only not visible in consequence of its translucency, or whether these corpuscles are developed into the nucleus. The chorda dorsalis accords with the vegetable cells, at least in this respect, that young cells are formed within the old ones. . . .

To sum up the researches upon the chorda dorsalis in a few words; it may be said to consist of polyhedral cells, which have, in or on the internal surface of their walls, a structure, according in its form and position with the nucleus of the cells of plants, namely, an oval flat disc containing one, two, or more rarely three nucleoli. The cells usually lie in close contact with each other; but sometimes at points where three or more cells meet together, a sort of intercellular substance, or an intercellular passage is seen. Young cells, which are at first round, and float free, are formed within parent cells. Nuclei of the characteristic form, are not distinctly observed in these young cells, but sometimes a small globule lies upon their inner surface. . . .

## *Cells in Cartilage*

The accordance of the structure of cartilage with the tissue of plants is of more importance in reference to animal organization. We have here to do not only with a more widely extended animal tissue, but also with one which, at least, in its subsequent stages of development, contains vessels, and therefore bears more decidedly the character of an animal tissue. The simplest form of cartilage is exhibited in the cartilages of the branchial rays of fishes. If, for example, a branchial ray of Cyprinus erythropthalmus be loosened from the branchial arch, and the mucous membrane be removed by gentle scraping, the cartilage remaining presents the appearance of a little (*Turn to next page*)

# Cells in Animal Tissue—*Continued*

rod, which diminishes from the point of its insertion on the branchial arch towards its free end, its sides being somewhat compressed, and exhibiting on their margins some blunt prominences. The structure of this cartilage is very simple. At the point it perfectly resembles, in its whole appearance, the parenchymotous cellular tissue of plants. Little polyhedral cell-cavities with rounded corners are seen lying closely together. The cell-cavities are separated from each other by extremely thin partition walls. The cell-contents are transparent, and a small pale round nucleus may be seen in some cells when in the recent state, in others only after the action of water upon them. The structure of the lateral prominences of the cartilage is similar to that at the point, only that the cells are somewhat extended in length. Advancing from that point towards the middle, or still better, from the point towards the root of the branchial ray, the partition walls of the cell-cavities are observed to become gradually thicker; and the cavities are here somewhat smaller. On the thickened cell-walls it may now also be seen that the intermediate substance of the cell-cavities is not a simple structure, but one composed of the walls peculiar to the contiguous cells; that is to say, each cell is surrounded with a thick ring, its peculiar wall, the external outline of which is more or less distinct. In the preparation from which the delineation is taken, it was in some parts quite as distinct as the internal. Between two cells these external outlines blend into one line, but separate again when the contact of the cell-walls ceases; there is thus often left between the cell-walls a three or four-cornered intermediate space filled with a kind of intercellular substance. No other structure, no deposition of strata or distinction between primary cell-membrane and secondary deposit can be observed in the thickened cell-walls. The cell-contents also remain clear after the thickening of the walls. At the base of the branchial ray, it is scarcely possible to distinguish between the different cell-walls, and the cartilage presents the appearance of a homogeneous substance, in which separate small cavities only are seen.

## *Cells in all Tissues*

The object, then, of the present investigation was to show that the mode in which the molecules composing the elementary particles of organisms are combined does not vary according to the physiological significance of those particles, but that they are everywhere arranged according to the same laws; so that whether a muscular fiber, a nerve-tube, an ovum, or a blood-corpuscle is to be formed, a corpuscle of a certain form, subject only to some modifications, a cell-nucleus, is universally generated in the first instance; around this corpuscle a cell is developed, and it is the changes which one or more of these cells undergo that determine the subsequent forms of the elementary particles; in short, that there is one common principle of development for all the elementary particles of organisms.

In order to establish this point it was necessary to trace the progress of development in two given elementary parts, physiologically dissimilar, and to compare them with one another. If these not only completely agreed in growth, but in their mode of generation also, the principle was established that elementary parts, quite distinct in a physiological sense, may be developed according to the same laws. This was the theme of the first section of this work. The course of development of the cells of cartilage and of the cells of the chorda dorsalis was compared with that of vegetable cells. Were the cells of plants developed merely as infinitely minute vesicles which progressively expand, were the circumstances of their development less characteristic than those pointed out by Schleiden, a comparison, in the sense here required, would scarcely have been possible. We endeavored to prove in the first section that the complicated process of development in the cells of plants recurs in those of cartilage and of the chorda dorsalis. We remarked the similarity in the formation of the cell-nucleus, and of its nucleolus in all its modifications, with the nucleus of vegetable cells, the pre-existence of the cell-nucleus and the development of the cell around it, the similar situation of the nucleus in relation to the cell, the growth of the cells, and the thickening of their wall during growth, the formation of cells within cells, and the transformation of the cell-contents just as in the cells of plants. Here, then, was a complete accordance in every known stage in the progress of development of two elementary parts which are quite distinct, in a physiological sense, and it was established that the principle of development in two such parts may be the same, and so far as could be ascertained in the cases here compared, it is really the same. . . .

It was, in fact, shown that the elementary parts of most tissues, when traced backwards from their state of complete development to their primary condition are only developments of cells, which so far as our observations, still incomplete, extend, seemed to be formed in a similar manner to the cells compared in the first section. As might be expected, according to this principle the cells, in their earliest stage, were almost always furnished with the characteristic nuclei, in some the pre-existence of this nucleus, and the formation of the cell around it was proved, and it was then that the cells began to undergo the various modifications, from which the diverse forms of the elementary parts of animals resulted. Thus the apparent difference in the mode of development of muscular fibres and blood-corpuscles, the former originating by the arrangement of globules in rows, the latter by the formation of a vesicle around a globule, was reconciled in the fact that muscular fibres are not elementary parts co-ordinate with blood-corpuscles, but that the globules composing muscular fibres at first correspond to the blood-corpuscles, and are like them, vesicles or cells, containing the characteristic cell-nucleus, which, like the nucleus of the blood-corpuscles, is probably formed before the cell. The elementary parts of all tissues are formed of cells in an analogous, though very diversified manner, so that it may be asserted, *that there is one universal principle of development for the elementary parts of organisms, however different, and that this principle is the formation of cells.* This is the chief result of the foregoing observations.

**Theodor Schwann** was born at Neuss, Prussia, December 7, 1810, and died at Liége January 11, 1882. He studied physiology under Johannes Müller at the University of Berlin, from which he was graduated in 1834. Three years later he was discussing with his friend Schleiden the structure of plants when it occurred to him that the cells which he had seen in animal fibers must be like those which Schleiden was studying in plants. He at once began a series of researches, whose results were published as "Microscopic Investigations" in 1839, when the author was 29 years old. Schwann in the meantime had accepted the chair of anatomy in the Roman Catholic University at Louvain. In 1847 he went as Professor to Liége, where he taught for the remainder of his life.

## Ancient Man in Florida

*Anthropology*

Digging along the edge of a country club golf course at Melbourne, Florida, Dr. J. W. Gidley, paleontologist of the U. S. National Museum, has discovered new and important evidence that men inhabited America more than 50,000 years ago.

Dr. Gidley has just returned from Florida, bringing with him an arrow point found four feet below the surface of the golf links and 20 inches down in an undisturbed deposit of Pleistocene age. A few feet away, in the same layer of compact sand, were the scattered bones of mastodon, one of the great elephants generally supposed to have disappeared from this country long before man appeared on this side of the world.

Careful study of the geologic features of the region has convinced Dr. Gidley that both the arrowhead and the prehistoric elephant were deposited there in the Pleistocene period, in the age when northern America was in the icy grip of great glaciers. There is no possibility, he said, that the arrow could have found its way into this layer of sand, at a later time, without leaving traces in the layers of swampy soil lying above the Pleistocene layer.

Immediately upon making the discovery, Dr. Gildey telegraphed to the Smithsonian Institution; and Dr. Frank H. H. Roberts, Jr., of the Bureau of American Ethnology, hurried down to Melbourne to see the arrow before it was removed.

Dr. Gidley states that his chief achievement in the expedition was the geologic study of the area which proves conclusively that the human skull which he found at Melbourne in 1925 was deposited there in Pleistocene times and could not have been intruded into the ancient layer at a later date.

*Science News-Letter, May 19, 1928*

## Chickens Battle Snakes

*Zoology*

German poultry is able to maintain its own "Watch on the Rhine" against invading enemies. The country around Geestemuende, in Hanover, has recently suffered from an outbreak of vipers. These snakes are troublesomely poisonous, though their bites are not often fatal. The farmers' best snake alarms were their hens, which always set up a clatter when a viper appeared. A number of cases were reported of battles between a snake on one side and a flock of hens on the other, in which the reptiles were invariably pecked to death.

*Science News-Letter, May 19, 1928*

## Nature Ramblings

By Frank Thone

*Natural History*

**Baltimore Oriole**

When the colonists sent out by Cecil Calvert, Lord Baltimore, in 1633, landed on the beautiful shores of Chesapeake Bay, they found among the forests one of the loveliest birds they had ever seen, and because it was marked on back and breast with the colors of the coat-of-arms of their noble patron it received the name Baltimore oriole.

And the great house of Calvert need feel no shame to have such a herald. The Baltimore oriole comes as near being a perfect bird as any creature that flies with feathers. It is gracefully shaped, and its colors are the combination of richness and restraint that mark the taste of a blood-aristocrat. It loves the woods, yet does not disdain to dwell among the houses of men—provided they have enough respect for themselves to provide decently broad lawns for elm trees to grow on. And it pays ground-rent, or rather air-rent, both with charming song and industrious warfare on man's endless army of insect foes.

The nest of the Baltimore oriole is one of the miracles of bird architecture. How a pair of these birds, beginning with nothing but a forked twig swinging in the breeze and an odd lot of grasses, string and hair, can weave such a secure pocket with such utterly unsuited tools as a bird's beak and feet, is still beyond the understanding of naturalists. There is no particular system or pattern about the weaving, yet the nest fibers are so thoroughly interplaited that one could trust one's money or jewelry to such a pouch. Here the young orioles grow up with never a thought of the fear of cats, or even of thieving squirrels, that must torture birds whose instincts limit their nest-building to the comparatively stiff and accessible larger branches and limbs.

*Science News-Letter, May 19, 1928*

## New Pneumonia Serum

*Medicine*

A new serum for treating pneumonia, developed by Dr. L. D. Felton of Harvard University, has given very promising results in combatting this highly fatal disease.

The serum marks an advance in that it can be used for all four of the recognized types of pneumonia, according to Dr. Russell L. Cecil of the Bellevue Hospital, who has obtained very efficacious results from its use in the pneumonia clinic of that hospital. It works best with types one and two, the two groups that comprise the majority of pneumonia cases. The recoveries after its use with type one have been very encouraging, indeed, Dr. Cecil declared, though the deadly type three which always has had a very high death rate has proved the least amenable of any group.

Pneumonia serums used in the past have been specific for each type. Since certain laboratory procedures have to be followed out before the type from which the patient is suffering can be determined, precious time often has to be lost before the doctors know which serum to give. The Felton serum of mixed cultures can be administered on admission to the hospital and frequently a gain of many hours can be made in checking the course of the disease.

*Science News-Letter, May 19, 1928*

## Oldest Medical Book

*Medicine*

Skilled surgeons in the valley of the Nile knew more about human anatomy than their descendants of the middle ages, thousands of years later.

This is one of the surprising facts revealed by the translation of the Edwin Smith Papyrus, the oldest scientific book in the world, which has been completed by Prof. James Henry Breasted, well known egyptologist of the University of Chicago. The manuscript is now being printed for the New York History Society, the owner of the document, by the Oxford University Press.

The papyrus is regarded as the most important document in the history of all science that has come down to us from the time before the ancient Greeks. It is remarkable in that it shows an amazing approach to the attitude of the present day scientist, in striking contrast to the long lists of mingled charms and recipes that constitute a large share of the medical papyri of ancient Egypt.

*Science News-Letter, May 19, 1928*

## Untrustworthy Instinct

*Natural History*

WM. E. RITTER, in *The Natural History of Our Conduct* (Harcourt, Brace & Co.):

Our discussion of maladaptive activity among high-cultured peoples has taken no account of the fact that whereas human conduct among such peoples is always assumed to be consciously aimed at the attainment of welfare, in the majority of cases there is uncertainly both as to what welfare is and to what course of action will attain it.

Cultured man has, by the very fact of being cultured, many more things to do than his brute or even savage human ancestors have, and this gives him just so many more ways for overdoing, and so many more chances of doing the wrong things. For the nutritional group of activities, one of the marks of high culture is increased dependence of the individuals on knowledge, common and technical, to protect them from increased danger due to increased complexity of food materials and general nutritional conditions, such knowledge being made essential by the absence of improvement in the inherent defectiveness of the nutritional activity.

Proof of the untrustworthiness of appetite, taste, "instinct," comes from the scientific study of nutrition. Depending on taste alone, anybody is liable to eat foods which though ample as to quantity, are so deficient in some ingredients essential to complete nutrition that illness and death may result. Beri-beri, a disease common among those Orientals whose diet is rice, is a case in point. Polishing the rice to suit the taste of consumers deprives it of essential nutrient constituents Something comparable to this occurs among all sorts of peoples. The robbing of wheat flour of some of its most important food elements by milling is a notable instance of the same sort of thing. The "new knowledge of nutrition" consists largely in discovering how far we civilized people are led by our tastes and appetites, worked upon by custom and advertising, into eating foods seriously deficient or positively injurious as to certain of their elements.

*Science News-Letter, May 19, 1928*

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The Diana monkey is named after the moon goddess because it has a crescent shaped white mark on its forehead.

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A full-grown specimen of the Big Tree of California may bear as many as a million cones a year.

## Elegy on a Lobster

*Zoology*

FRANCES S. MILLER, in *Wellesley College News:*

Far from his native ocean's mud,
Of friends and family bereft,
A lobster lies within this pan—
At least the part of him that's left.

He did not die a natural death,
A martyr for the cause of knowledge,
He drew through gills his final breath
To teach me Zoo in Wellesley College.

Nor has he decent burial,
These few remains were not respected,
His shell removed, his inmost parts
Were well inspected and dissected.

The secret chambers of his heart
Were probed, his very nerve I stole;
Indeed I would have torn apart,
Could I have found it, e'en his soul.

Perhaps in lobster-paradise
He opens wide his mouth and sings,
His rostrum crowned with halo bright,
His claws developed into wings.

My sketches of his "brain" and glands
My only souvenirs will be.
I'm loth to part with him for aye—
And doubtless quite cut up is he.

Thus passes he (oh, could I too!)
My life with him forever ceases;
So dump him out and let him sleep
If not in peace, at least in pieces.

*Science News-Letter, May 19, 1928*

## Advertising Congestion

*Sociology*

PROF. GEORGE BURTON HOTCHKISS, in an address before the Technical Publicity Association:

A very serious problem confronts the advertiser of today because of the approaching saturation of advertising. The problem is not dissimilar in some ways, to that of the automobile field, which is confronted by the saturation of the roadways, so that increasing production of automobiles is more or less hampered by the difficulty of finding some place to put them. Of course, there is a remedy there—that of building more highways and possibly of increasing the average speed of cars on existing highways. Those physical remedies do not so readily serve the advertiser. He is confronted with the congestion of advertising media and the solution can hardly come through the publication of new media except as those new media reach audiences that haven't been reached before.

*Science News-Letter, May 19, 1928*

## Insect Marriage Customs

*Entomology*

MAURICE MAETERLINCK, in *Mountain Paths* (Dodd Mead):

All said, the marriage-customs are dreadful and, contrary to that which happens in every other world, here it is the female of the pair that stands for strength and intelligence and also for the cruelty and tyranny which appear to be their inevitable outcome. Almost every wedding ends in the violent and immediate death of the husband. Often, the bride begins by eating a certain number of suitors. The prototype of these fantastic unions could be supplied by the Languedocian Scorpions, who, as we know, carry lobster-claws and a long tail supplied with a sting, the prick of which is extremely dangerous. They have a prelude to the festival in the shape of a sentimental stroll, claw in claw; then, motionless, with fingers still gripped, they contemplate each other blissfully, interminably; day and night pass over their ecstasy, while they remain face to face, petrified with admiration. Next, the foreheads come together and touch; the mouths—if we can give the name mouth to the monstrous orifice that opens between the claws—are joined in a sort of kiss; after which the union is accomplished, the male is transfixed with a mortal sting and the terrible spouse crunches and gobbles him up with gusto.

But the Mantis, the ecstatic insect with arms always raised in an attitude of supreme invocation, the horrible *Mantis religiosa* or Praying Mantis, does better still; she eats her husbands (for the insatiable creature sometimes consumes seven or eight in succession) while they strain her passionately to their heart. Her inconceivable kisses devour, not in a metaphorical, but in an appallingly real fashion, the ill-fated choice of her soul stomach. She begins with the head, goes down to the thorax, nor stops till she comes to the hind-legs, which she deems too tough. She then pushes away the unfortunate remains, while a new lover, who was quietly awaiting the end of the monstrous banquet, heroically steps forward to undergo the same fate.

*Science News-Letter, May 19, 1928*

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When the horse was introduced to the Babylonians they called the strange animal the "ass of the East."

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A huge exhibition in Berlin is devoted to showing the public what science knows about nutrition and malnutrition.

# FIRST GLANCES AT NEW BOOKS

THE LITTLE BOOKS OF MODERN KNOWLEDGE—*Doubleday, Doran and Company.* (75c). Little books often accomplish large things. Matthew, Mark, Luke and John all wrote little books, and givers of modern gospels, in science, philosophy, history or any other discipline, do well when they follow their example. The present series are concisely written little books, speaking with authority on their respective subjects, and of shape and weight that enable them to slip into a coat pocket without constituting a conscious burden. Titles at present in hand include *The Earth, the Sun and the Moon,* by George Forbes; *Man in the Making,* by R. R. Maett; *The Races of Mankind,* by H. J. Fleure; *The Body,* by R. C. Macfie; *The Mind and Its Workings,* by C. E. M. Joad; *The Development of Political Ideas,* by F. J. C. Hearnshaw; *Catholicism,* by M. C. D'Arcy; *Protestantism,* by W. R. Inge; *A History of Russia,* by D. S. Mirsky; *A History of India,* by Edward Thompson; *Myths of Greece and Rome,* by Jane Harrison.

*General Science*
*Science News-Letter, May 19, 1928*

READING AND STUDY—Gerald Alan Yoakum—*Macmillan.* A practical reference book for the modern teacher who realizes that there is an important and complex connection between reading and study, but does not always know what to do about it. The author describes recent scientific experiments, discusses methods of reading and study, and suggests procedures in detail for the first six grades.

*Psychology*
*Science News-Letter, May 19, 1928*

CHEMICAL AMUSEMENTS AND EXPERIMENTS—Charles R. Gibson—*Lippincott.* Advice to the youthful chemist. Not so useful to future chemists of America, however, because instructions for obtaining materials and apparatus to be used in the sample set-ups refer to English firms.

*General Science*
*Science News-Letter, May 19, 1928*

THE YOUNG COLLECTOR—Wheeler McMillen—*Appleton* ($1.75). Strangely enough, as badly needed a book as this has never appeared before. A good guide to the pre-adolescent energy that fills up the house with unlimited and too often unclassified junk.

*Pedagogy*
*Science News-Letter, May 19, 1928*

THE WORLD COURT—Manley O. Hudson—*World Peace Foundation* (30c). A summary of the judgments, orders and advisory opinions of the Court, with appendices on the documents concerning the Court and on the relations of America to the body.

*Sociology*
*Science News-Letter, May 19, 1928*

THE MIDDLE AGES—E. B. Osborn—*Doubleday* ($1.50). A compact history in the newer and better manner, telling of movements and institutions rather than of battles and treaties. The latter receive their share of attention, to be sure, but are themselves shown in their relations to each other and to the period as a whole, under the head "The Defense of Christendom."

*History*
*Science News-Letter, May 19, 1928*

HEALTH AND WEALTH—Louis I. Dublin—*Harpers* ($3.00). Shows where we stand in the scale of health and economics. Many of the chapters have appeared in leading magazines.

*Economics*
*Science News-Letter, May 19, 1928*

THE NATIVE PROBLEM IN AFRICA, 2 Vols.—By Raymond L. Buell—*Macmillan* ($15.00). A bird's-eye view of the problems that have arisen out of the contact of primitive peoples with industrial civilization. The bearing of American rubber and financial interests in Liberia on the future status of the natives comes in for heavy criticism.

*Ethnology*
*Science News-Letter, May 19, 1928*

THE FAMILY IN THE MAKING—Mary Burt Messer—*Putnam.* Another account of woman's status in the family from the fall of the matriarchies to the present break-up of domesticity.

*Anthropology*
*Science News-Letter, May 19, 1928*

AN ADVENTURE WITH CHILDREN—Mary H. Lewis—*Macmillan.* A potent argument for progressive schools.

*Pedagogy*
*Science News-Letter, May 19, 1928*

LIVING WITH OUR CHILDREN—Lillian M. Gilbreth—*Norton* ($2.50). The mother of eleven shows how it can be done.

*Education*
*Science News-Letter, May 19, 1928*

THE *ABC* OF FLIGHT—W. Laurence Le Page—*Wiley* ($1.50). For the person who has been thrilled by Lindbergh's achievements, the night air mail or a short joy hop in the air, this book is written. How simple flying really is, how airplanes are designed and how to fly are some of the points covered in readable and accurate language.

*Aeronautics*
*Science News-Letter, May 19, 1928*

EVERYBODY'S AVIATION GUIDE—Victor W. Page—*Henley* ($2). In question and answer form with ample illustrations, this book will serve the layman seeking detailed knowledge of airplanes and airships.

*Aeronautics*
*Science News-Letter, May 19, 1928*

THE GLANDS OF DESTINY—Ivo Geikie Cobb—*Macmillan.* ($3.00). The bearing of endocrine secretions on personality explained and elucidated.

*Medicine*
*Science News-Letter, May 19, 1928*

HOME FLOWER-GROWING—Emil C. Volz—*Macmillan* ($3.50). A complete, well-arranged, well-illustrated practical book for the flower lover.

*Horticulture*
*Science News-Letter, May 19, 1928*

ADVENTURES IN FLOWER GARDENING—Sydney B. Mitchell—*Amer. Library Assn.* (25c). A very timely addition to the Reading With a Purpose series.

*Horticulture*
*Science News-Letter, May 19, 1928*

FISHES OF CHESAPEAKE BAY—Samuel F. Hildegrand and William C. Schroeder—*Govt. Printing Office* ($1.50). A complete monograph of the piscifauna of one of the most important of American fishing waters.

*Ichthyology*
*Science News-Letter, May 19, 1928*

ALGEBRAIC NUMBERS—*National Research Council* ($1.50). The report of a committee headed by Prof. H. S. VanDiver. It covers all the literature on the subject since 1895.

*Mathematics*
*Science News-Letter, May 19, 1928*

SCIENCE AND PHILOSOPHY—Bernard Bosanquet—*Macmillan.* A posthumous collection of twenty-four essays and criticism on science, logic, metaphysics, ethics and esthetics by one of the foremost British philosophers of our generation.

*Philosophy*
*Science News-Letter, May 19, 1928*

# A Statement of Purpose

(The aims, ideals and aspirations of an institution)

SCIENCE SERVICE is a unique institution, established at Washington for the purpose of disseminating scientific information to the public. It aims to act as a sort of liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language. Scientific progress is so rapid and revolutionary nowadays that no one can keep up with it from what he learned at school. Science Service endeavors to provide life-continuation courses in all the sciences for newspaper readers anywhere in America without tuition fees or entrance examinations.

In a democracy like ours it is particularly important that the people as a whole should so far as possible understand the aims and achievements of modern science, not only because of the value of such knowledge to themselves but because research directly or indirectly depends upon popular appreciation of its methods. In fact the success of democratic institutions, as well as the prosperity of the individual, may be said to depend upon the ability of people to distinguish between science and fakes, bewteen the genuine expert and the pretender.

Science Service spares no pains or expense in the endeavor (1) to get the best possible quality of popular science writing and (2) to get it to the largest possible number of readers. If in doing this it can make both ends meet, so much the better. If not, it will do it anyway.

Through the generosity of E. W. Scripps, Science Service has been assured of such financial support as to insure its independence and permanence. Mr. Scripps's long and wide experience as a newspaper editor and proprietor had convinced him of the importance of scientific research as the foundation of the prosperity of the nation and as guide to sound thinking and living and he realized the need for an independent agency that would bring the results of research to the attention of the entire people so these could be applied to the solution of their personal, social or political problems.

Science Service is chartered as a non-profit-making institution and all receipts from articles, books, lectures and films are devoted to opening up new avenues for the diffusion of knowledge and developing promising methods of popular education. Although Science Service has a philanthropic purpose, it is conducted on business principles, with the aim of making each branch of its activities ultimately self-supporting so far as possible. All acceptable contributions are paid for and all published articles are charged for.

Science Service is under the control of a Board of Trustees composed of ten scientists and five journalists. The leading national organizations of all the sciences, the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science, appoint three trustees each.

Science Service occupies offices in the magnificent new building of the National Academy of Sciences and the National Research Council on Potomac Park opposite the Lincoln Memorial.

This strategic situation enables the Service to keep constantly in touch with the progress of the sciences because new inventions and discoveries are promptly put on exhibition in the building, and the Council brings together investigators in the various sciences and leaders in engineering and industry from all parts of the country.

Science Service is not a governmental institution, but it is in close contact with the numerous governmental bureaus of research. It is not under the control of any clique, class or commercial interest. It is not the organ of any single scientific association. It serves all the sciences. It engages in no propaganda, unless it be called propaganda to urge the value of research and the usefulness of science.

Science Service began its work on January 1, 1921, and has now a sizable office staff with a large corps of contributors in the chief research institutions of this country and Europe.